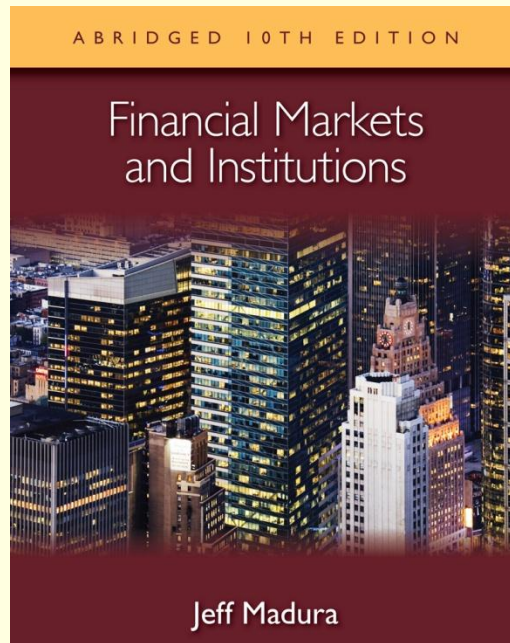


Financial Markets and Institutions

Abridged 10th Edition

by Jeff Madura



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19 Bank Management

Chapter Objectives

- describe the underlying goal, strategy, and governance of banks
- explain how banks manage liquidity
- explain how banks manage interest rate risk
- explain how banks manage credit risk
- explain integrated bank management

Bank Goals, Strategy, and Governance

Aligning Managerial Compensation with Bank Goals

Banks may implement compensation programs that provide bonuses to managers that satisfy bank goals.

Bank Strategy

- A bank's decisions on sources of funds will heavily influence its interest expenses on the income statement.
- A bank's asset structure will strongly influence its interest revenue on the income statement.
- **How Financial Markets Facilitate the Bank's Strategy**
To implement their strategy, commercial banks rely heavily on financial markets.

Exhibit 19.1 Participation of Commercial Banks in Financial Markets

FINANCIAL MARKET	PARTICIPATION BY COMMERCIAL BANKS
Money markets	As banks offer deposits, they must compete with other financial institutions in the money market along with the Treasury to obtain short-term funds. They serve households that wish to invest funds for short-term periods.
Mortgage markets	Some banks offer mortgage loans on homes and commercial property and therefore provide financing in the mortgage market.
Bond markets	Commercial banks purchase bonds issued by corporations, the Treasury, and municipalities.
Futures markets	Commercial banks take positions in futures to hedge interest rate risk.
Options markets	Commercial banks take positions in options on futures to hedge interest rate risk.
Swaps markets	Commercial banks engage in interest rate swaps to hedge interest rate risk.

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Bank Goals, Strategy, and Governance

Bank Governance by the Board of Directors

Some of the more important functions of bank directors are to:

- Determine a compensation system for the bank's executives.
- Ensure proper disclosure of the bank's financial condition and performance to investors.
- Oversee growth strategies such as acquisitions.
- Oversee policies for changing the capital structure, including decisions to raise capital or to engage in stock repurchases.
- Assess the bank's performance and ensure that corrective action is taken if the performance is weak because of poor management.

Bank Goals, Strategy, and Governance

Bank Governance by the Board of Directors

■ Inside versus Outside Directors

- Board members who are also managers of the bank (i.e. **inside directors**) may sometimes face a conflict of interests because their decisions as board members may affect their jobs as managers.
- **Outside directors** (directors who are not managers) are generally expected to be more effective at overseeing a bank: they do not face a conflict of interests in serving shareholders.

Bank Goals, Strategy, and Governance

Other Forms of Bank Governance

- Publicly traded banks are subject to potential shareholder activism.
- The market for corporate control serves as a form of governance because bank managers recognize that they could lose their jobs if their bank is acquired.

Managing Liquidity

- Banks can experience illiquidity when cash outflows (due to deposit withdrawals, loans, etc.) exceed cash inflows (new deposits, loan repayments, etc.).
- They can resolve cash deficiencies by creating additional liabilities or by selling assets.
- Some assets are more marketable than others, so a bank's asset composition can affect its degree of liquidity.

Managing Liquidity

Use of Securitization to Boost Liquidity

- The ability to securitize assets such as automobile and mortgage loans can enhance a bank's liquidity.
- The process of securitization involves the sale of assets by the bank to a trustee, who issues securities that are collateralized by the assets.

■ Collateralized Loan Obligations

Commercial banks can obtain funds by packaging their commercial loans with those of other financial institutions.

■ Liquidity Problems

Typically preceded by other financial problems such as major defaults on their loans.

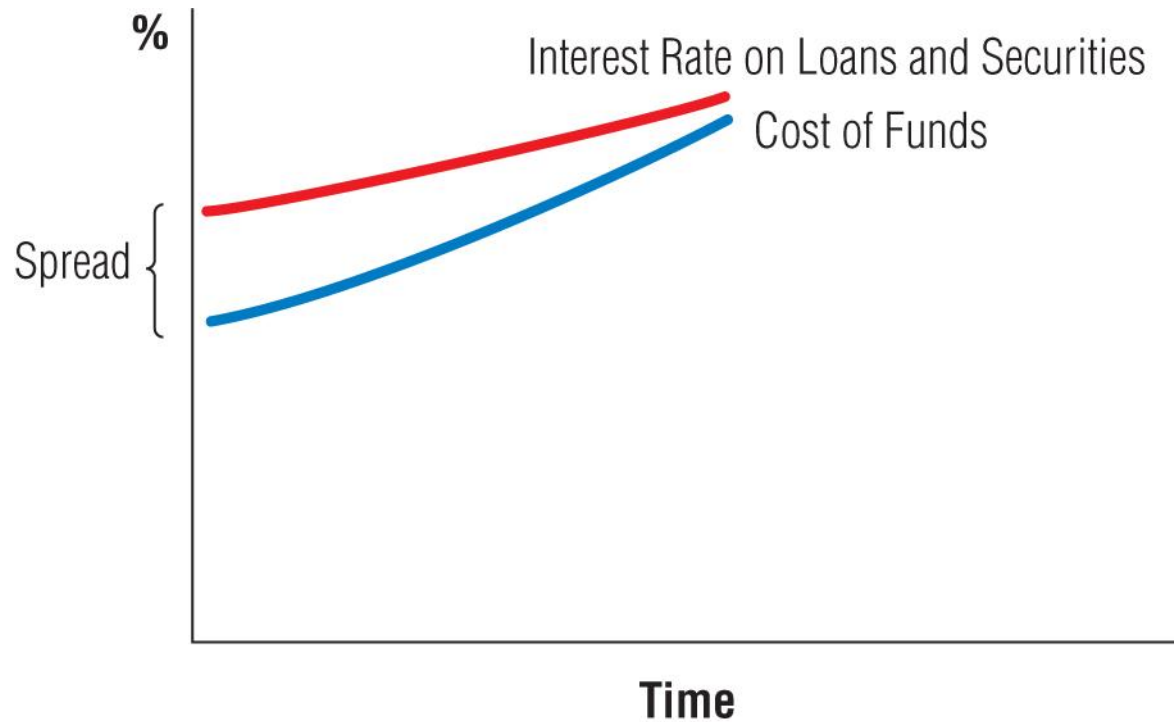
Managing Interest Rate Risk

- **Net Interest Margin** (spread) is the difference between interest payments received and interest paid:

$$\text{Net Interest Margin} = \frac{\text{Interest Revenues} - \text{Interest Expenses}}{\text{Assets}}$$

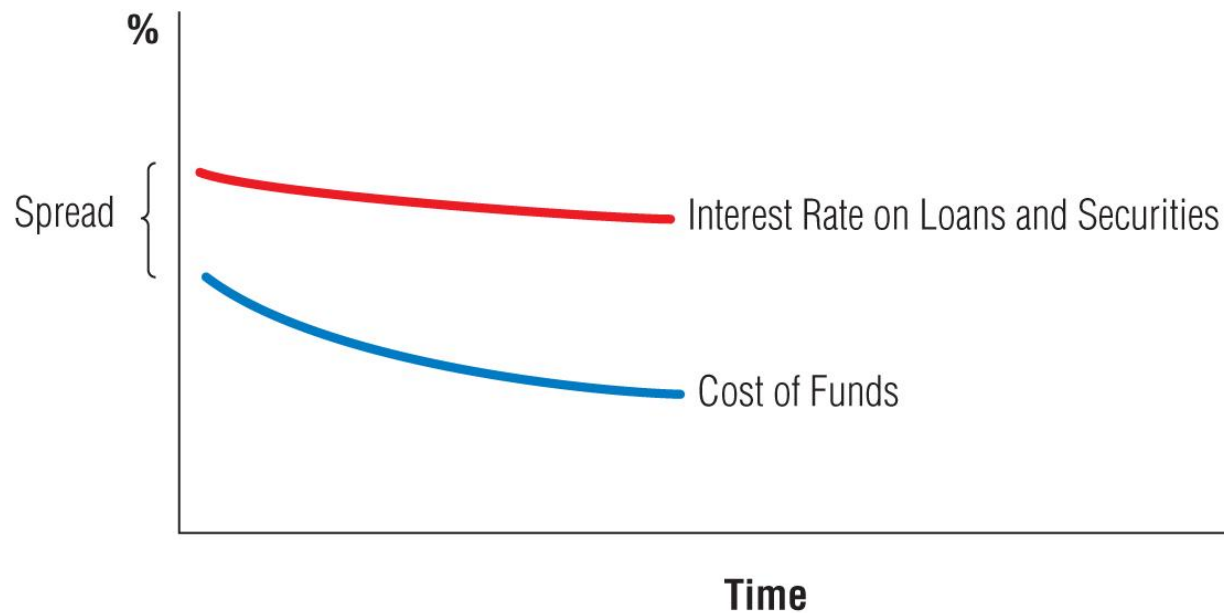
- During a period of rising interest rates, a bank's net interest margin will likely decrease if its liabilities are more rate sensitive than its assets.
- The deposit rates will typically be more sensitive if their turnover is quicker.
- A bank measures the risk and then uses its assessment of future interest rates to decide whether and how to hedge the risk.

Exhibit 19.2 Impact of Increasing Interest Rates on a Bank's Net Interest Margin (if the Bank's Liabilities are More Sensitive Than Its Assets)



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Exhibit 19.3 Impact of Decreasing Interest Rates on a Bank's Net Interest Margin (if the Bank's Liabilities are More Sensitive Than Its Assets)



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Methods Used to Assess Interest Rate Risk

- Gap analysis
- Duration analysis
- Regression analysis

Managing Interest Rate Risk

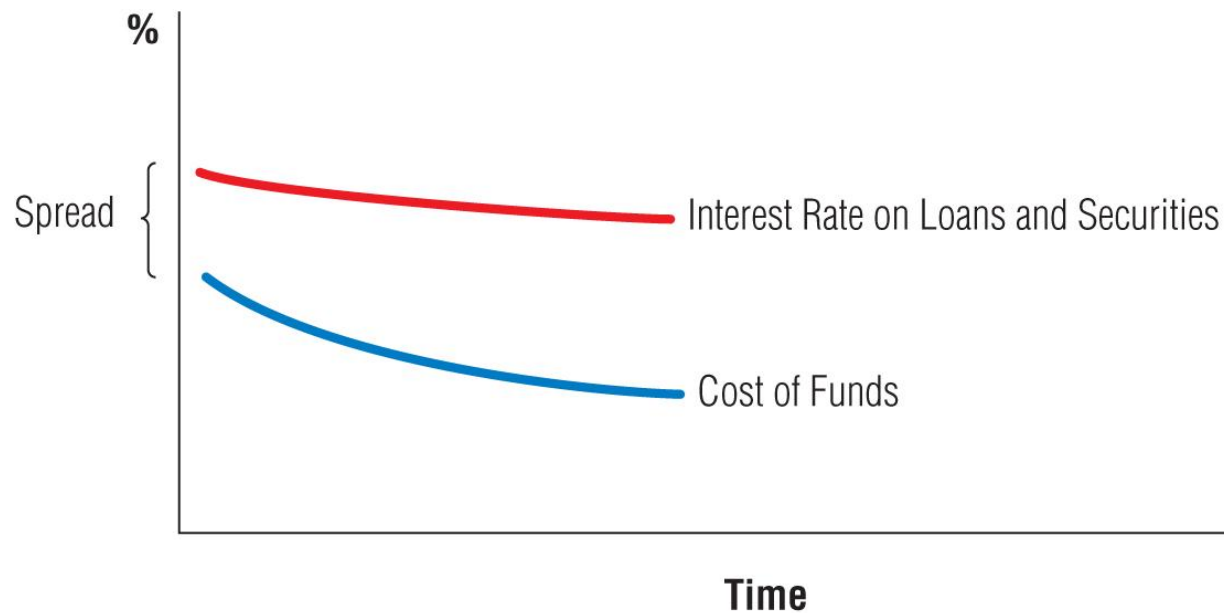
Methods Used to Assess Interest Rate Risk

- **Gap Analysis** - Banks can attempt to determine their interest rate risk by monitoring their gap over time, where:

$$\text{Gap} = \text{Rate-sensitive assets} - \text{Rate-sensitive liabilities}$$

- An alternative formula is the **gap ratio**, which is measured as the volume of rate sensitive assets divided by rate-sensitive liabilities.
- Many banks classify interest-sensitive assets and liabilities into various categories based on the timing in which interest rates are reset .

Exhibit 19.4 Interest-Sensitive Assets and Liabilities: Illustration of the Gap Measured for Various Maturity Ranges for Deacon Bank



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Managing Interest Rate Risk

Methods Used to Assess Interest Rate Risk

■ Duration Measurement

$$DUR = \frac{\sum_{t=1}^n \frac{C_t(t)}{(1+k)^t}}{\sum_{t=1}^n \frac{C_t}{(1+k)^t}}$$

where :

C = represents the interest or principal payments of the assets

t = the time at which the payments are provided

k = required rate of return on the asset

Managing Interest Rate Risk

Methods Used to Assess Interest Rate Risk

- The bank can then estimate its **duration gap**, which is measured as the difference between the weighted duration of the bank's assets and the weighted duration of its liabilities, adjusted for the firm's asset size:

$$\begin{aligned}\text{DURPGAP} &= \frac{\text{DURAS} \times \text{AS}}{\text{AS}} - \frac{\text{DURLIAB} \times \text{LIAB}}{\text{AS}} \\ &= \text{DURAS} - \text{DURLIAB} \left(\frac{\text{LIAB}}{\text{AS}} \right)\end{aligned}$$

where

DURAS = weighted average duration of the bank's assets

DURLIAB = weighted average duration of the bank's liabilities

AS = market value of the bank's assets

LIAB = market value of the bank's liabilities

Managing Interest Rate Risk

Methods Used to Assess Interest Rate Risk

■ Regression Analysis

- A bank can assess interest rate risk by determining how performance has historically been influenced by interest rate movements.
- This requires that proxies be identified for bank performance and for prevailing interest rates and that a model be chosen that can estimate their relationship.
- When a bank uses regression analysis to determine its sensitivity to interest rate movements, it may combine this analysis with the value-at-risk (VaR) method to determine how its market value would change in response to specific interest rate movements.

Managing Interest Rate Risk

Whether to Hedge Interest Rate Risk

- A bank can consider the measurement of its interest rate risk along with its forecast of interest rate movements to determine whether it should consider hedging that risk.

Managing Interest Rate Risk

Methods Used to Reduce Interest Rate Risk

- Maturity matching
- Using-floating rate loans
- Using interest rate futures contracts
- Using interest rate swaps
- Using interest rate caps

Managing Interest Rate Risk

Methods Used to Reduce Interest Rate Risk

- **Maturity Matching** - match each deposit's maturity with an asset of the same maturity.
- **Using Floating-Rate Loans** - Allows banks to support long-term assets with short-term deposits without overly exposing themselves to interest rate risk.

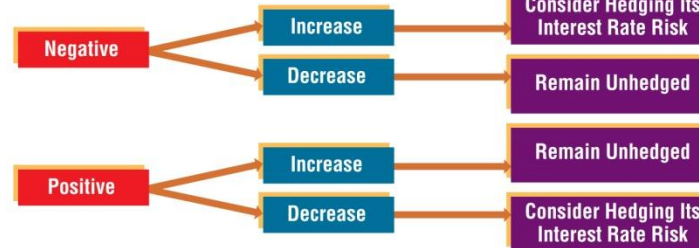
Exhibit 19.5 Framework for Managing Interest Rate Risk

1. GAP ANALYSIS

IF THE BANK'S GAP IS:

... AND THE BANK
EXPECTS INTEREST
RATES TO:

... THE BANK SHOULD:



2. DURATION GAP ANALYSIS

IF THE BANK'S
DURATION GAP IS:

... AND THE BANK
EXPECTS INTEREST
RATES TO:

... THE BANK SHOULD:

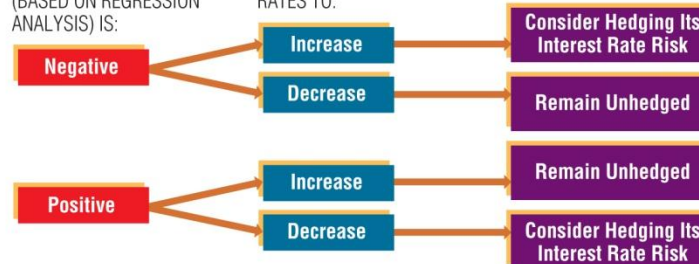


3. REGRESSION ANALYSIS

IF THE BANK'S INTEREST
RATE COEFFICIENT
(BASED ON REGRESSION
ANALYSIS) IS:

... AND THE BANK
EXPECTS INTEREST
RATES TO:

... THE BANK SHOULD:



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Managing Interest Rate Risk

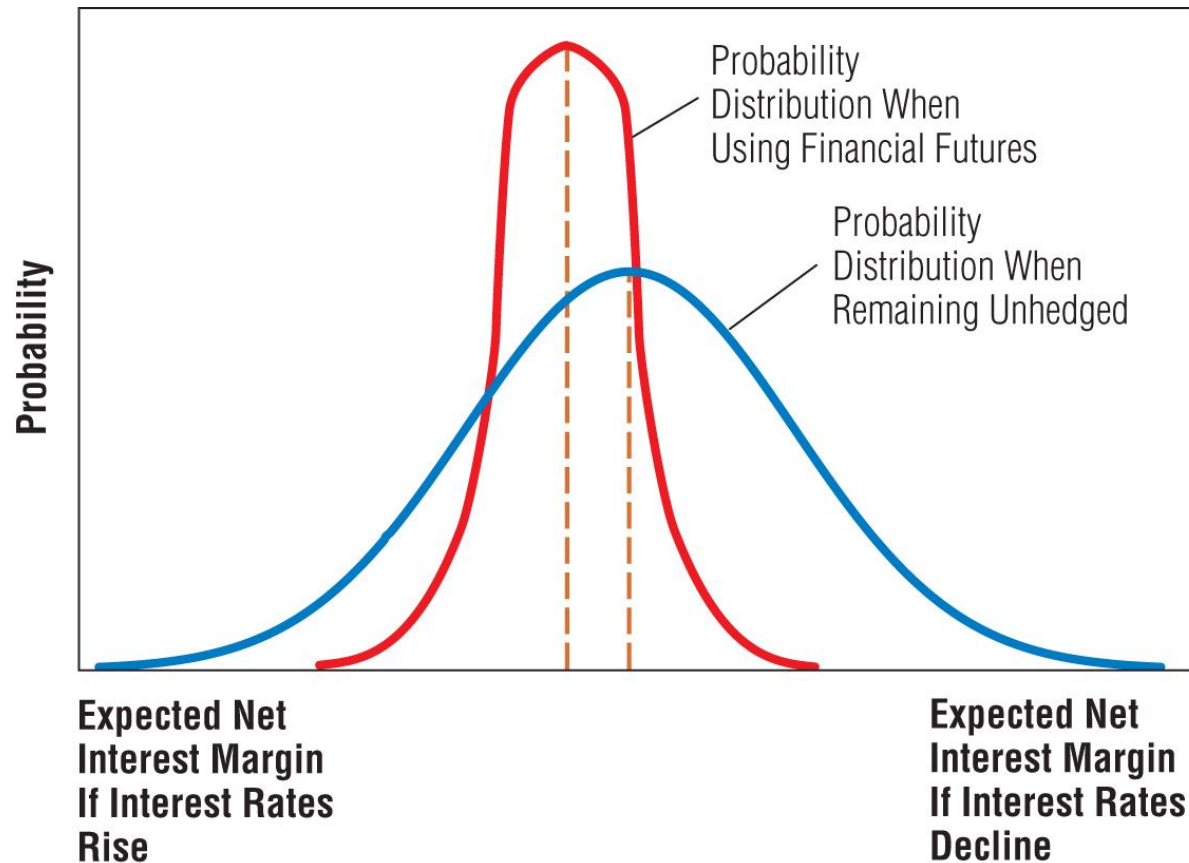
Methods Used to Reduce Interest Rate Risk (cont.)

■ Using Interest Rate Futures Contracts

- Interest rate futures contracts lock in the price at which financial instruments can be purchased or sold on a specified future settlement date.
- Financial futures contracts can reduce the uncertainty about a bank's net interest margin.

■ Using Interest Rate Swaps - an arrangement to exchange periodic cash flows based on specified interest rates

Exhibit 19.6 Effect of Financial Futures on the Net Interest Margin of Banks That Have More Rate-Sensitive Liabilities Than Assets



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Exhibit 19.7 Illustration of an Interest Rate Swap

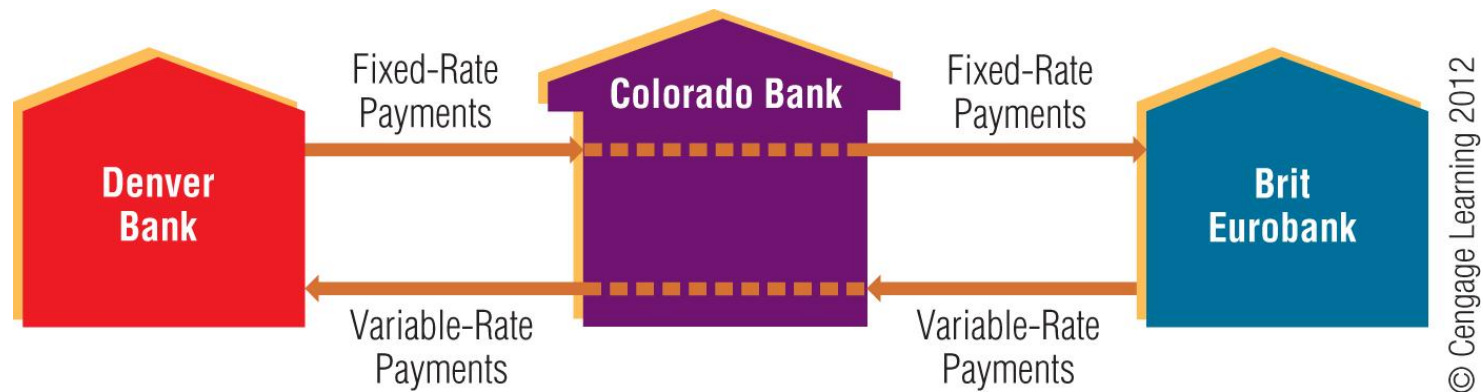


Exhibit 19.8 Comparison of Denver Bank's Spread: Unhedged versus Hedged

UNHEDGED STRATEGY	POSSIBLE FUTURE LIBOR RATES					
	7%	8%	9%	10%	11%	12%
Average rate on existing mortgages	11%	11%	11%	11%	11%	11%
Average cost of deposits	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
Spread	5	4	3	2	1	0
HEDGING WITH AN INTEREST RATE SWAP						
Fixed interest rate earned on fixed-rate mortgages	11	11	11	11	11	11
Fixed interest rate owed on swap arrangement	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>
Spread on fixed-rate payments	2	2	2	2	2	2
Variable interest rate earned on swap arrangement	7	8	9	10	11	12
Variable interest rate owed on deposits	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
Spread on variable-rate payments	1	1	1	1	1	1
Combined total spread when using the swap	3	3	3	3	3	3

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Managing Interest Rate Risk

Methods Used to Reduce Interest Rate Risk (Cont.)

■ Using Interest Rate Caps

- Agreements (for a fee) to receive payments when the interest rate of a particular security or index rises above a specified level during a specified time period.
- During periods of rising interest rates, the cap provides compensation that can offset the reduction in spread during such periods.

International Interest Rate Risk - When a bank has foreign currency balances, the strategy of matching the overall interest rate sensitivity of assets to that of liabilities will not automatically achieve a low degree of interest rate risk.

Managing Credit Risk

Measuring Credit Risk: Banks employ credit analysts who review the financial information of corporations applying for loans and evaluate their creditworthiness.

■ **Determining the Collateral**

When a bank assesses a request for credit, it must decide whether to require collateral that can back the loan in case the borrower is unable to make the payments.

■ **Determining the Loan Rate**

- If the bank decides to grant the loan, it can use its evaluation of the firm to determine the appropriate interest rate.
- Some loans to high-quality (low-risk) customers are commonly offered at rates below the prime rate.

Managing Credit Risk

Trade-off between Credit Risk and Return

- If a bank wants to minimize credit risk, it can use most of its funds to purchase Treasury securities.
- A bank concerned with maximizing its return could use most of its funds to provide credit card and consumer loans.

Managing Credit Risk

Trade-off between Credit Risk and Return

- **Expected Return and Risk of Subprime Mortgage Loans**
 - Many commercial banks aggressively funded subprime mortgage loans in the 2004–2006 period by originating the mortgages or purchasing mortgage-backed securities that represented subprime mortgages.
 - The banks did not anticipate the credit crisis that occurred in the 2008–2009 period and that the value of many homes would decline far below the amount owed on the mortgage.

Managing Credit Risk

Reducing Credit Risk

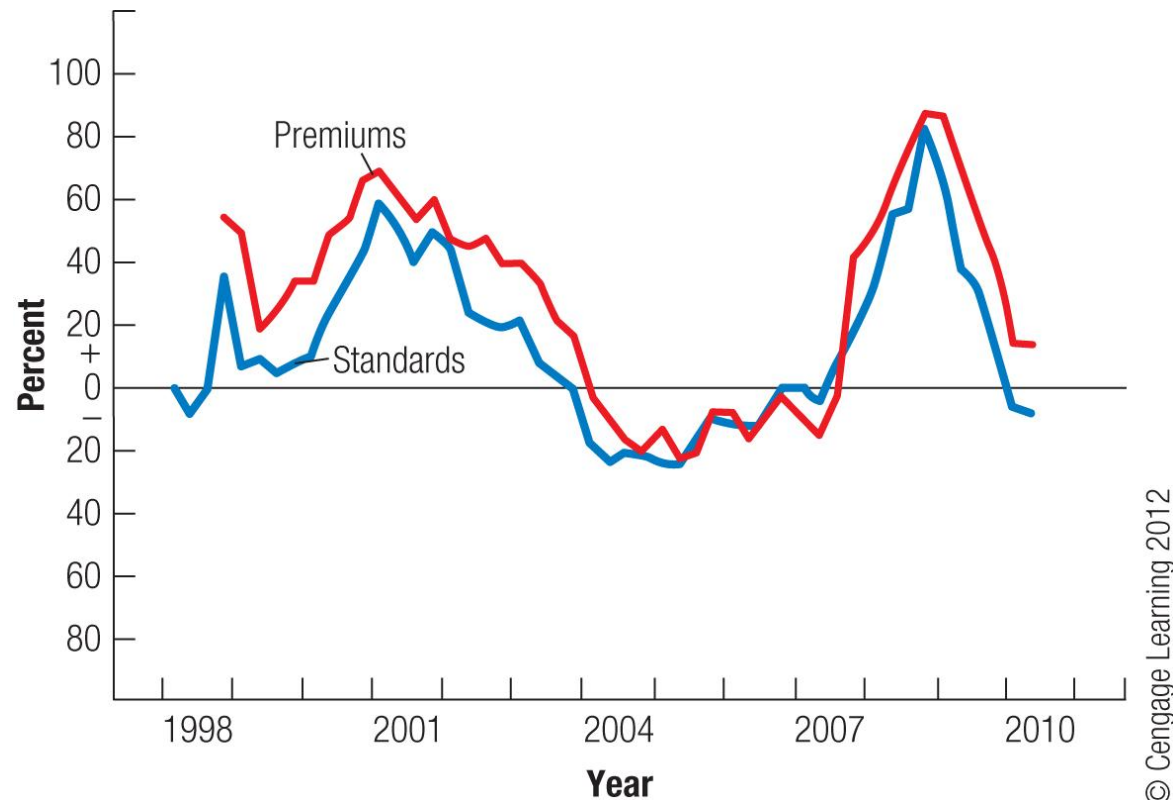
- **Industry Diversification of Loans** - Banks should diversify their loans to ensure that their customers are not dependent on a common source of income.
- **International Diversification of Loans** - Many banks reduce their exposure to U.S. economic conditions by diversifying their loan portfolio internationally.

Managing Credit Risk

Reducing Credit Risk (cont.)

- **Selling Loans** - Banks can eliminate loans that are causing excessive risk to their loan portfolios by selling them in the secondary market.
- **Revising the Loan Portfolio in Response to Economic Conditions** – banks continually assess both the overall composition of their loan portfolios and the economic environment.

Exhibit 19.9 Change in Risk Premiums on Bank Loans and in Bank Loan Standards over Time



Source: Federal Reserve.

Managing Market Risk

- Market risk results from changes in the value of securities due to changes in financial market conditions such as interest rate movements, exchange rate movements, and equity prices.
- As banks pursue new services related to the trading of securities, they have become much more susceptible to market risk.
- The increase in banks' exposure to market risk is also attributed to their increased participation in the trading of derivative contracts.

Managing Market Risk

Measuring Market Risk

Banks commonly measure their exposure to market risk by applying the value-at-risk (VaR) method, which involves determining the largest possible loss that would occur as a result of changes in market prices based on a specified percent confidence level.

- **Bank Revisions of Market Risk Measurements -** Banks continually revise their estimate of market risk in response to changes in their investment and credit positions and to changes in market conditions.
- **Relationship between a Bank's Market Risk and Interest Rate Risk -** Partially dependent on its exposure to interest rate risk.

Managing Market Risk

Methods Used to Reduce Market Risk

- Could reduce the amount of transactions in which it serves as guarantor for its clients or reduce the bank's investment in foreign debt securities that are subject to adverse events in a specific region.
- Could attempt to take some trading positions to offset some of its exposure to market risk.
- Could sell some of its securities that are heavily exposed to market risk.

Integrated Bank Management

Application

- Exhibits 19.10, 19.11, & 19.12.
- Could attempt to take some trading positions to offset some of its exposure to market risk.

Integrated Bank Management

■ Management of Bank Capital

- The return to shareholders is the return on equity (ROE):

$$\text{ROE} = \frac{\text{Net profit after taxes}}{\text{Equity}}$$

$$\text{ROE} = \text{Return on assets (ROA)} \times \text{Leverage Measure}$$

$$\frac{\text{Net profit after taxes}}{\text{Equity}} = \frac{\text{Net profit after taxes}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Equity}}$$

- The ratio (assets / equity) is called the **leverage measure** because leverage reflects the volume of assets a firm supports with equity.

Exhibit 19.10 Balance Sheet of Atlanta Bank (in Millions of Dollars)

ASSETS			LIABILITIES AND CAPITAL		
Required reserves		\$ 400	Demand deposits		\$ 500
Commercial loans			NOW accounts		1,200
Floating-rate	3,000		MMDAs		2,000
Fixed-rate	1,100		CDs		
Total		4,100	Short-term	1,500	
Consumer loans		2,500	From 1 to 5 years	3,800	
Mortgages			Total		5,300
Floating-rate	500		Long-term bonds		200
Fixed-rate	None		CAPITAL		800
Total		500			
Treasury securities					
Short-term	1,000				
Long-term	None				
Total		1,000			
Corporate securities					
High-rated	None				
Medium-rated	1,000				
Total		1,000			
Municipal securities					
High-rated	None				
Medium-rated	None				
Total		None			
Fixed assets		500			
TOTAL ASSETS		\$10,000	TOTAL LIABILITIES AND CAPITAL		\$10,000

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Exhibit 19.11 Comparative Balance Sheet of Atlanta Bank

ASSETS			LIABILITIES AND CAPITAL		
	PERCENTAGE OF ASSETS FOR ATLANTA BANK	AVERAGE PERCENTAGE FOR INDUSTRY		PERCENTAGE OF TOTAL FOR ATLANTA BANK	AVERAGE PERCENTAGE FOR INDUSTRY
Required reserves	4%	4%	Demand deposits	5%	17%
Commercial loans			NOW accounts	12	8
Floating-rate	30	20	MMDAs	20	20
Fixed-rate	<u>11</u>	<u>11</u>	CDs		
Total	41	31	Short-term	15	35
Consumer loans	25	20	From 1 to 5 years	38	10
Mortgages			Long-term bonds	2	2
Floating-rate	5	7	CAPITAL	8	8
Fixed-rate	<u>0</u>	<u>3</u>			
Total	5	10			
Treasury securities					
Short-term	10	7			
Long-term	<u>0</u>	<u>8</u>			
Total	10	15			
Corporate securities					
High-rated	0	5			
Medium-rated	<u>10</u>	<u>5</u>			
Total	10	10			
Municipal securities					
High-rated	0	3			
Medium-rated	<u>0</u>	<u>2</u>			
Total	0	5			
Fixed assets	<u>5</u>	<u>5</u>			
TOTAL ASSETS	100%	100%	TOTAL LIABILITIES AND CAPITAL	100%	100%

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Exhibit 19.12 Evaluation of Atlanta Bank Based on its Balance Sheet

MAIN INFLUENTIAL COMPONENTS		EVALUATION OF ATLANTA BANK RELATIVE TO INDUSTRY
Interest expenses	All liabilities except demand deposits.	Higher than industry average because it concentrates more on high-rate deposits than the norm.
Noninterest expenses	Loan volume and checkable deposit volume.	Possibly higher than the norm; its checkable deposit volume is less than the norm, but its loan volume is greater than the norm.
Interest revenues	Volume and composition of loans and securities.	Potentially higher than industry average because its assets are generally riskier than the norm.
Exposure to credit risk	Volume and composition of loans and securities.	Higher concentration of loans than industry average; it has a greater percentage of risky assets than the norm.
Exposure to interest rate risk	Maturities on liabilities and assets; use of floating-rate loans.	Lower than the industry average; it has more medium-term liabilities, fewer assets with very long maturities, and more floating-rate loans.

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Managing Risk of International Operations

Exchange Rate Risk

- When a bank providing a loan requires that the borrower repay in the currency denominating the loan, it may be able to avoid exchange rate risk.

Settlement Risk

- International banks that engage in large currency transactions are exposed not only to exchange rate risk as a result of their different currency positions but also to settlement risk, or the risk of a loss due to settling their transactions.

SUMMARY

- The underlying goal of bank management is to maximize the wealth of the bank's shareholders, which implies maximizing the price of the bank's stock (if the bank is publicly traded). A bank's board of directors needs to monitor bank managers to ensure that managerial decisions are intended to serve shareholders.
- Banks manage liquidity by maintaining some liquid assets such as short-term securities and ensuring easy access to funds (through the federal funds market).

SUMMARY (Cont.)

- Banks measure their sensitivity to interest rate movements so that they can assess their exposure to interest rate risk. Common methods of measuring interest rate risk include gap analysis, duration analysis, and measuring the sensitivity of earnings (or stock returns) to interest rate movements.
- Banks can reduce their interest rate risk by matching the maturities of their assets and liabilities or by using floating-rate loans to create more rate sensitivity in their assets. Alternatively, they could sell financial futures contracts or engage in a swap of fixed-rate payments for floating-rate payments.

SUMMARY (Cont.)

- Banks manage credit risk by carefully assessing the borrowers who apply for loans and by limiting the amount of funds they allocate toward risky loans (such as credit card loans). They also diversify their loans across borrowers of different regions and industries so that the loan portfolio is not overly susceptible to financial problems in any single region or industry.
- An evaluation of a bank includes assessment of its exposure to interest rate movements and to credit risk. This assessment can be used along with a forecast of interest rates and economic conditions to forecast the bank's future performance.